CURRENT STATUS OF THE CLAIMS

In the Claims

The following is a marked-up version of the claims with the language that is underlined ("___") being added and the language that contains strikethrough ("—") being deleted:

1. (PREVIOUSLY PRESENTED) A structure, comprising:

   a nanospecies having a first characteristic and a second detectable characteristic, wherein a second detectable energy is produced corresponding to the second detectable characteristic upon exposure to a first energy; and

   a porous material having the first characteristic and a plurality of pores, wherein the first characteristic of the nanospecies and the first characteristic of the porous material are the same, where the interaction of the first characteristic of the nanospecies with the first characteristic of the porous material cause the nanospecies to interact with the porous material and become disposed in the pores of the porous material, and wherein the first characteristic is selected from a hydrophobic characteristic, a hydrophilic characteristic, an electrostatic characteristic, and combinations thereof.

2. (ORIGINAL) The structure of claim 1, wherein the nanospecies is selected from a semiconductor quantum dot, a metal nanoparticle, a biomolecule, and a magnetic nanoparticle.

3. (ORIGINAL) The structure of claim 2, wherein the metal nanoparticle is selected from gold nanoparticles, platinum nanoparticles, silver nanoparticles, and copper nanoparticles.

4. (ORIGINAL) The structure of claim 2, wherein the biomolecule is selected from polypeptides, polynucleotides, proteins, ligands, receptors, antigens, antibodies, and discrete portions thereof.

5. (ORIGINAL) The structure of claim 1, wherein the porous material is selected from a mesoporous material, a macroporous material, and a hybrid mesoporous/macroporous material.

6. (CURRENTLY AMENDED) The structure of claim 1, wherein the porous material is made of a material selected from a metal, a silica material, ceramic, zeolite, and combinations thereof.

7. (ORIGINAL) The structure of claim 1, wherein the porous material is silica having a hydrocarbon-derivatized surface.

8. (CANCELED)

9. (ORIGINAL) The structure of claim 1, wherein the second detectable characteristic is selected from a fluorescent characteristic, a magnetic characteristic, a luminescent characteristic, a light scattering characteristic, and a surface plasmonic characteristic.

10. (ORIGINAL) The structure of claim 1, wherein the nanospecies is coated with a chemical compound, wherein the nanospecies has the first characteristic after being coated with the chemical compound.

11. (PREVIOUSLY PRESENTED) The structure of claim 6, wherein the nanospecies is a hydrophobic coated semiconductor quantum dot, wherein the coating includes a hydrophobic compound coated on the semiconductor quantum dot.

12. (ORIGINAL) The structure of claim 11, wherein the hydrophobic compound is selected from a $O=PR_3$ compound, an $O=PHR_2$ compound, an $O=PHR_1$ compound, a H_2NR compound, a HNR_2 compound, a NR_3 compound, a HSR compound, a SR_2 compound, and combinations thereof, wherein R is selected from C_1 to C_{18} hydrocarbons, and combinations thereof.

13. (ORIGINAL) The structure of claim 12, wherein R is a saturated linear C_4 to C_{18} hydrocarbon.

14. (ORIGINAL) The structure of claim 11, wherein the hydrophobic compound is selected from an $O{=}PR_3$ compound, a HNR_2 compound, a HSR compound, a SR_2 compound, and combinations thereof.

15. (ORIGINAL) The structure of claim 11, wherein the hydrophobic compound is selected from tri-n-octylphosphine, stearic acid, and octyldecyl amine.

16. (ORIGINAL) The structure of claim 11, wherein the hydrophobic compound includes tri-n-octylphosphine.

17. (ORIGINAL) The structure of claim 11, wherein the hydrophobic compound includes stearic acid.

18. (ORIGINAL) The structure of claim 11, wherein the hydrophobic compound includes octyldecyl amine.

19. (ORIGINAL) The structure of claim 11, wherein the quantum dot comprises a core and a cap.

20. (ORIGINAL) The structure of claim 11, wherein the core of the quantum dot is selected from the group consisting of IIB-VIB semiconductors, IIIB-VB semiconductors, and IVB-IVB semiconductors.

21. (ORIGINAL) The structure of claim 20, wherein the core of the quantum dot is selected from the group consisting of IIB-VIB semiconductors.

22. (ORIGINAL) The structure of claim 20, wherein the core of the quantum dot is CdS or CdSe.

23. (ORIGINAL) The structure of claim 20, wherein the cap is selected from the group consisting of IIB-VIB semiconductors of high band gap.

24. (ORIGINAL) The structure of claim 20, wherein the cap is selected from ZnS and CdS.

25. (CURRENTLY AMENDED) The structure of claim 1, further comprising a probe ~~attached~~ bonded directly to the porous material.

26. (CURRENTLY AMENDED) The structure of claim 1, further comprising a probe ~~attached~~ bonded indirectly to the porous material via a linking compound, the linking compound is bonded directly to the porous material.

27. (ORIGINAL) The structure of claim 26, where the probe is selected from a biomolecule and a biomolecule attached to a fluorophore.

28. (CANCELED)

29. (CURRENTLY AMENDED) The structure of claim 1, further comprising a probe, ~~attached~~ bonded to the porous material, and a fluorophore and a quenching moiety ~~attached~~ bonded to the probe.

30. (WITHDRAWN) A method of preparing a structure, comprising:

providing a nanospecies having a first characteristic and a second detectable characteristic, wherein a second detectable energy is produced corresponding to the second detectable characteristic upon exposure to a first energy;

providing a porous material having the first characteristic;

introducing the nanospecies and the porous material in the presence of a solution; and

forming the structure, wherein the structure includes a porous material having a plurality of nanospecies disposed at least within the pores of the porous material, wherein the first characteristic causes the nanospecies to interact with the porous material and become disposed within the pores of the porous material.

31. (WITHDRAWN) The method of claim 30, wherein the nanospecies is selected from a semiconductor quantum dot, a metal nanoparticle, a biomolecule, and a magnetic nanoparticle.

32. (WITHDRAWN) The method of claim 31, wherein the metal nanoparticle is selected from gold nanoparticles, platinum nanoparticles, silver nanoparticles, and copper nanoparticles.

33. (WITHDRAWN) The method of claim 31, wherein the biomolecule is selected from polypeptides, polynucleotides, proteins, ligands, receptors, antigens, antibodies, and discrete portions thereof.

34. (WITHDRAWN) The method of claim 30, wherein the porous material is selected from a mesoporous material, a macroporous material, and a hybrid mesoporous/macroporous material.

35. (WITHDRAWN) The method of claim 30, wherein the porous material is made of a material selected from a polymer, a metal, a silica material, cellulose, ceramic, zeolite, and combinations thereof.

36. (WITHDRAWN) The method of claim 30, wherein the porous material is silica having a hydrocarbon-derivatized surface.

37. (WITHDRAWN) The method of claim 30, wherein the first characteristic is selected from a hydrophobic characteristic, a hydrophilic characteristic, an electrostatic characteristic, a biological characteristic, a bioaffinity characteristic, a ligand-receptor characteristic, an antibody-antigen characteristic, and combinations thereof.

38. (WITHDRAWN) The method of claim 30, wherein the second detectable characteristic is selected from a fluorescent characteristic, a magnetic characteristic, a luminescent characteristic, a light scattering characteristic, and a surface plasmonic characteristic.

39. (WITHDRAWN) The method of claim 30, wherein the nanospecies is coated with a chemical compound, wherein the nanospecies has the first characteristic after being coated with the chemical compound.

40. (WITHDRAWN) The method of claim 30, wherein the nanospecies is a hydrophobic coated semiconductor quantum dot, wherein the coating includes a hydrophobic compound substantially disposed on the semiconductor quantum dot.

41. (WITHDRAWN) The method of claim 30, wherein the hydrophobic compound is selected from a $O{=}PR_3$ compound, an $O{=}PHR_2$ compound, an $O{=}PHR_1$ compound, a H_2NR compound, a HNR_2 compound, a NR_3 compound, a HSR compound, a SR_2 compound, and combinations thereof, wherein R is selected from C_1 to C_{18} hydrocarbons, and combinations thereof.

42. (WITHDRAWN) The method of claim 41, wherein R is a saturated linear C_4 to C_{18} hydrocarbon.

43. (WITHDRAWN) The method of claim 40, wherein the hydrophobic compound is selected from a $O=PR_3$ compound, a HNR_2 compound, a HSR compound, a SR_2 compound, and combinations thereof.

44. (WITHDRAWN) The method of claim 40, wherein the hydrophobic compound is selected from tri-n-octylphosphine, stearic acid, and octyldecyl amine.

45. (WITHDRAWN) The method of claim 30, wherein the porous material includes silica beads and the nanospecieis includes coated hydrophobic semiconductor quantum dots and introducing includes mixing the silica beads and the coated hydrophobic semiconductor quantum dots in a solution of alcohol and chloroform.

46. (WITHDRAWN) A method of detecting at least one target, comprising:

contacting at least one structure of claim 1 with a sample, wherein the sample contains at least one target molecule, wherein each structure corresponds to only one type of target molecule, wherein when the type of target molecule is present in the sample, the structure interacts with the target molecule, and wherein each of the at least one structures has a second detectable characteristic; and

detecting at least one of the second detectable characteristics, wherein detection of each second detectable characteristic indicates that the presence of the target in the sample.

47. (WITHDRAWN) The method of claim 46, further comprising:

exposing the at least one structure to a first energy; and

detecting at least one second energy corresponding to the second detectable characteristic, wherein the at least one second energy is produced in response to the first energy.

48. (WITHDRAWN) The method of claim 46, wherein each target molecule includes a third detectable characteristic, and wherein detecting includes:

detecting at least one of the second detectable characteristics and the third detectable characteristics, wherein detection of the second detectable characteristic and the third detectable characteristic indicates the presence of the target molecule in the sample.

49. (WITHDRAWN) The method of claim 48, further comprising:

exposing the at least one structure to a first energy; and

detecting at least one second energy corresponding to the second detectable characteristic and a third energy corresponding to the third detectable characteristic, wherein the at least one second energy is produced in response to the first energy.

50. (WITHDRAWN) The method of claim 46, wherein the target molecule is a biomolecule.

51. (WITHDRAWN) The method of claim 50, wherein the target molecule includes a fluorophore.

52. (WITHDRAWN) The method of claim 46, wherein the second detectable characteristic is selected from a fluorescent characteristic, a magnetic characteristic, a luminescent characteristic, a light scattering characteristic, and a surface plasmonic characteristic.

53. (PREVIOUSLY PRESENTED) A array system comprising:

a plurality of structures, including:

a nanospecies having a first characteristic and a second detectable characteristic, wherein a second detectable energy is produced corresponding to the second detectable characteristic upon exposure to a first energy; and

a porous material having the first characteristic and a plurality of pores, wherein the first characteristic of the nanospecies and the first characteristic of the porous material are the same; where the interaction of the first characteristic of the nanospecies with the first characteristic of the porous material cause the nanospecies to interact with the porous material and become disposed in the pores of the porous material; and wherein the first characteristic is selected from a hydrophobic characteristic, a hydrophilic characteristic, an electrostatic characteristic, and combinations thereof.

54. (PREVIOUSLY PRESENTED) A diagnostic library, comprising:

a plurality of structures, including:

a nanospecies having a first characteristic and a second detectable characteristic, wherein a second detectable energy is produced corresponding to the second detectable characteristic upon exposure to a first energy; and

a porous material having the first characteristic and a plurality of pores, wherein the first characteristic of the nanospecies and the first characteristic of the porous material are the same; where the interaction of the first characteristic of the nanospecies with the first characteristic of the porous material cause the nanospecies to interact with the porous material and become disposed in the pores of the porous material; and wherein the first characteristic is selected from a hydrophobic characteristic, a hydrophilic characteristic, an electrostatic characteristic, and combinations thereof.

55. (PREVIOUSLY PRESENTED) A combinatorial library, comprising:

a plurality of structures, including:

a nanospecies having a first characteristic and a second detectable characteristic, wherein a second detectable energy is produced corresponding to the second detectable characteristic upon exposure to a first energy; and

a porous material having the first characteristic and a plurality of pores, wherein the first characteristic of the nanospecies and the first characteristic of the porous material are the same; where the interaction of the first characteristic of the nanospecies with the first characteristic of the porous material cause the nanospecies to interact with the porous material and become disposed in the pores of the porous material; and wherein the first characteristic is selected from a hydrophobic characteristic, a hydrophilic characteristic, an electrostatic characteristic, and combinations thereof.

56. (PREVIOUSLY PRESENTED) A fluorescent ink, comprising:

a plurality of structures, including:

a nanospecies having a first characteristic and a second detectable characteristic, wherein a second detectable energy is produced corresponding to the second detectable characteristic upon exposure to a first energy; and

a porous material having the first characteristic and a plurality of pores, wherein the first characteristic of the nanospecies and the first characteristic of the porous material are the same; where the interaction of the first characteristic of the nanospecies with the first characteristic of the porous material cause the nanospecies to interact with the porous material and become disposed in the pores of the porous material; and wherein the first characteristic is selected from a hydrophobic characteristic, a hydrophilic characteristic, an electrostatic characteristic, and combinations thereof.

57. (PREVIOUSLY PRESENTED) A fluorescent cosmetic, comprising:

a plurality of structures, including:

a nanospecies having a first characteristic and a second detectable characteristic, wherein a second detectable energy is produced corresponding to the second detectable characteristic upon exposure to a first energy; and

a porous material having the first characteristic and a plurality of pores, wherein the first characteristic of the nanospecies and the first characteristic of the porous material are the same; where the interaction of the first characteristic of the nanospecies with the first characteristic of the porous material cause the nanospecies to interact with the porous material and become disposed in the pores of the porous material; and wherein the first characteristic is selected from a hydrophobic characteristic, a hydrophilic characteristic, an electrostatic characteristic, and combinations thereof.

58. (PREVIOUSLY PRESENTED) A flow cytometry system, comprising:

a plurality of structures, including:

a nanospecies having a first characteristic and a second detectable characteristic, wherein a second detectable energy is produced corresponding to the second detectable characteristic upon exposure to a first energy; and

a porous material having the first characteristic and a plurality of pores, wherein the first characteristic of the nanospecies and the first characteristic of the porous material are the same; where the interaction of the first characteristic of the nanospecies with the first characteristic of the porous material cause the nanospecies to interact with the porous material and become disposed in the pores of the porous material; and wherein the first characteristic is selected from a hydrophobic characteristic, a hydrophilic characteristic, an electrostatic characteristic, and combinations thereof.

59. (PREVIOUSLY PRESENTED) A structure, comprising:

a hydrophobic coated semiconductor quantum dot, wherein the coating includes a hydrophobic compound coated on the semiconductor quantum dot, wherein the hydrophobic coated semiconductor quantum dot has a second detectable characteristic, and wherein a second detectable energy is produced corresponding to the second detectable characteristic upon exposure to a first energy; and

a silica material having a hydrocarbon-derivatized surface and having a plurality of pores, wherein the surface of the silica material is hydrophobic, wherein the hydrophobicity of the hydrophobic coated semiconductor quantum dot and the hydrophobicity of the silica material cause the hydrophobic coated semiconductor quantum dot to interact with the silica material and become disposed in the pores of the silica material.

60. (PREVIOUSLY PRESENTED) The structure of claim 59, wherein the silica material is selected from a mesoporous material, a macroporous material, and a hybrid mesoporous/macroporous material.

61. (PREVIOUSLY PRESENTED) The structure of claim 59, wherein the hydrophobic compound is selected from a $O=PR_3$ compound, an $O=PHR_2$ compound, an $O=PHR_1$ compound, a H_2NR compound, a HNR_2 compound, a NR_3 compound, a HSR compound, a SR_2 compound, and combinations thereof, wherein R is selected from C_1 to C_{18} hydrocarbons, and combinations thereof.

62. (PREVIOUSLY PRESENTED) The structure of claim 61, wherein R is a saturated linear C_4 to C_{18} hydrocarbon.

63. (PREVIOUSLY PRESENTED) The structure of claim 59, wherein the hydrophobic compound is selected from an $O=PR_3$ compound, a HNR_2 compound, a HSR compound, a SR_2 compound, and combinations thereof.

64. (PREVIOUSLY PRESENTED) The structure of claim 59, wherein the hydrophobic compound is selected from tri-n-octylphosphine, stearic acid, and octyldecyl amine.

65. (PREVIOUSLY PRESENTED) The structure of claim 59, wherein the hydrophobic compound includes tri-n-octylphosphine.

66. (PREVIOUSLY PRESENTED) The structure of claim 59, wherein the hydrophobic compound includes stearic acid.

67. (PREVIOUSLY PRESENTED) The structure of claim 59, wherein the hydrophobic compound includes octyldecyl amine.

68. (PREVIOUSLY PRESENTED) The structure of claim 59, wherein the semiconductor quantum dot comprises a core and a cap.

69. (PREVIOUSLY PRESENTED) The structure of claim 59, wherein the core of the semiconductor quantum dot is selected from the group consisting of IIB-VIB semiconductors, IIIB-VB semiconductors, and IVB-IVB semiconductors.

70. (PREVIOUSLY PRESENTED) The structure of claim 69, wherein the core of the semiconductor quantum dot is selected from the group consisting of IIB-VIB semiconductors.

71. (PREVIOUSLY PRESENTED) The structure of claim 69, wherein the core of the semiconductor quantum dot is CdS or CdSe.

72. (PREVIOUSLY PRESENTED) The structure of claim 69, wherein the cap is selected from the group consisting of IIB-VIB semiconductors of high band gap.

73. (PREVIOUSLY PRESENTED) The structure of claim 69, wherein the cap is selected from ZnS and CdS.

74. (PREVIOUSLY PRESENTED) A structure, comprising:

a nanospecies having a first characteristic and a second detectable characteristic, wherein the nanospecies is selected from a semiconductor quantum dot, a metal nanoparticle, and a magnetic nanoparticle, and wherein a second detectable energy is produced corresponding to the second detectable characteristic upon exposure to a first energy; and

a porous material having the first characteristic and a plurality of pores, wherein the porous material is made of a material selected from a metal, a silica material, ceramic, zeolite, and combinations thereof, wherein the first characteristic of the nanospecies and the first characteristic of the porous material are the same, wherein the interaction of the first characteristic of the nanospecies with the first characteristic of the porous material cause the nanospecies to interact with the porous material and become disposed in the pores of the porous material, and wherein the first characteristic is selected from a hydrophobic characteristic, a hydrophilic characteristic, and an electrostatic characteristic.

75. (PREVIOUSLY PRESENTED) The structure of claim 74, wherein the first characteristic is a hydrophobic characteristic.

76. (PREVIOUSLY PRESENTED) The structure of claim 74, wherein the first characteristic is a hydrophilic characteristic.

77. (PREVIOUSLY PRESENTED) The structure of claim 74, wherein the first characteristic is an electrostatic characteristic.

78. (PREVIOUSLY PRESENTED) The structure of claim 74, wherein the metal nanoparticle is selected from gold nanoparticles, platinum nanoparticles, silver nanoparticles, and copper nanoparticles.

79. (PREVIOUSLY PRESENTED) The structure of claim 74, wherein the porous material is selected from a mesoporous material, a macroporous material, and a hybrid mesoporous/macroporous material.

80. (PREVIOUSLY PRESENTED) The structure of claim 74, wherein the porous material is silica having a hydrocarbon-derivatized surface.

81. (NEW) The structure of claim 74, wherein the second detectable characteristic is selected from a fluorescent characteristic, a magnetic characteristic, a luminescent characteristic, a light scattering characteristic, and a surface plasmonic characteristic.

82. (PREVIOUSLY PRESENTED) The structure of claim 74, wherein the nanospecies is coated with a chemical compound, wherein the nanospecies has the first characteristic after being coated with the chemical compound.

83. (PREVIOUSLY PRESENTED) The structure of claim 74, wherein the nanospecies is a hydrophobic coated semiconductor quantum dot, wherein the coating includes a hydrophobic compound coated on the semiconductor quantum dot.

84. (PREVIOUSLY PRESENTED) The structure of claim 83, wherein the hydrophobic compound is selected from a $O{=}PR_3$ compound, an $O{=}PHR_2$ compound, an $O{=}PHR_1$ compound, a H_2NR compound, a HNR_2 compound, a NR_3 compound, a HSR compound, a SR_2 compound, and combinations thereof, wherein R is selected from C_1 to C_{18} hydrocarbons, and combinations thereof.

85. (PREVIOUSLY PRESENTED) The structure of claim 84, wherein R is a saturated linear C_4 to C_{18} hydrocarbon.

86. (PREVIOUSLY PRESENTED) The structure of claim 83, wherein the hydrophobic compound is selected from an $O{=}PR_3$ compound, a HNR_2 compound, a HSR compound, a SR_2 compound, and combinations thereof.

87. (PREVIOUSLY PRESENTED) The structure of claim 83, wherein the hydrophobic compound is selected from tri-n-octylphosphine, stearic acid, and octyldecyl amine.

88. (PREVIOUSLY PRESENTED) The structure of claim 83, wherein the hydrophobic compound includes tri-n-octylphosphine.

89. (PREVIOUSLY PRESENTED) The structure of claim 83, wherein the hydrophobic compound includes stearic acid.

90. (PREVIOUSLY PRESENTED) The structure of claim 83, wherein the hydrophobic compound includes octyldecyl amine.

91. (PREVIOUSLY PRESENTED) The structure of claim 83, wherein the semiconductor quantum dot comprises a core and a cap.

92. (PREVIOUSLY PRESENTED) The structure of claim 83, wherein the core of the semiconductor quantum dot is selected from the group consisting of IIB-VIB semiconductors, IIIB-VB semiconductors, and IVB-IVB semiconductors.

93. (PREVIOUSLY PRESENTED) The structure of claim 92, wherein the core of the semiconductor quantum dot is selected from the group consisting of IIB-VIB semiconductors.

94. (PREVIOUSLY PRESENTED) The structure of claim 92, wherein the core of the semiconductor quantum dot is CdS or CdSe.

95. (PREVIOUSLY PRESENTED) The structure of claim 92, wherein the cap is selected from the group consisting of IIB-VIB semiconductors of high band gap.

96. (PREVIOUSLY PRESENTED) The structure of claim 92, wherein the cap is selected from ZnS and CdS.